

REMARKS

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 1-7 and 9-21 are now present in the application. The specification and claim 1 has been amended. Claim 8 has been cancelled. Claim 1 is independent. Reconsideration of this application, as amended, is respectfully requested.

Specification

The specification has been amended to further clarify the present invention. In particular, Applicant respectfully submits the amended description "a thermal bubble surrounded by the liquid" is fully supported by FIGs. 2 and 4, for example, which clearly indicate that the thermal bubble 22 is surrounded by the liquid 20. Accordingly, Applicant respectfully submits that no new matter is entered. Entry of the above amendments to the specification is earnestly solicited.

Claim Objection

Claim 8 has been objected to due to the presence of minor informalities. Since claim 8 has been cancelled, this objection has been rendered moot. Reconsideration and withdrawal of this objection are respectfully requested.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-6 and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Dao et al., U.S. Patent No. 5,581,034. Claims 1-6, 9, 11, and 13-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Leung, U.S. Patent No. 6,182,509. These rejections are respectfully traversed.

In light of the foregoing amendments to the claims, Applicant respectfully submits that this rejection has been obviated and/or rendered moot. As the Examiner will note, dependent claim 8 has been incorporated into independent claim 1 and amended independent claim 1 now recites a combination of elements including “when the liquid is heated until a temperature of the heater reaches a vaporization point of the liquid, a thermal bubble surrounded by the liquid being gradually formed around the heater due to phase transition from liquid to gas”. Applicant respectfully submits that the above combination of elements as set forth in amended independent claim 1 is not disclosed nor suggested by the references relied on by the Examiner.

As the Examiner indicated, original (now-cancelled) claim 8 is not disclosed nor suggested by the Dao and Leung. Therefore, amended independent claim 1, which incorporates the elements of claim 8, is also not disclosed nor suggested by the Dao and Leung patents.

Since Dao and Leung fail to teach each and every limitation of amended independent claim 1, Applicant respectfully submits that all of

the claims clearly define over the teachings of these references. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102 are respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 7, 8, 10, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dao or Leung in view of Gaitan, U.S. Patent No. 6,171,800, and Bugnacki et al., "A Micromachined Thermal Accelerometer". This rejection is respectfully traversed.

As mentioned above, the Dao and Leung patents fail to teach the above combination of elements recited in amended independent claim 1. The Examiner correctly indicated that Dao and Leung fail to teach "a thermal bubble...formed around the heater". However, the Examiner indicated that Dao and Leung teach the "phase transition from liquid to gas" when the liquid is heated by the heater. Applicant respectfully disagrees.

Dao discloses a convective accelerometer and inclinometer filled with a gas or a liquid (although liquid is not recommended by Dao). In particular, Dao discloses that when the fluid adjacent to the heating element 16 is heated, the fluid adjacent to the heating element 16 would expand and rise and the cooler fluid would fall to the bottom of the enclosure (see col. 4, lines 33-46).

Leung discloses an accelerometer filled with a fluid or a gas. In particular, Leung teaches the heater 23 “heats the air around it and the temperature gradient established is shown by the solid lines 34 and 36 in FIG. 2” (see col. 3, lines 33-35).

However, Dao and Leung fail to teach that the temperature of the heater reaches a vaporization point of the liquid to cause the phase transition of the fluid from liquid to gas. Instead, Dao and Leung only teach a cooler fluid and a warmer fluid with the same phase.

Bugnacki fails to cure the deficiencies of Dao and Leung. Bugnacki discloses a micromachined thermal accelerometer filled with air. In particular, Bugnacki teaches “because the cool air around the bubble is denser than the warm air over the heating element, any change in the sensor’s motion and/or orientation causes the cooler air to force the heated bubble toward the end of the package cavity in the direction of acceleration” (see page 1, lines 24 – page 2, line 4). Although Bugnacki uses the term “bubble”, it is in fact a warm air over the heating element. In other words, Bugnacki teaches that the heated “bubble” is surround by the cooler air and thus fails to teach “a thermal bubble surrounded by the liquid being gradually formed around the heater” as recited in claim 1 (emphasis added). In addition, Bugnacki also fails to teach “the liquid is heated until a temperature of the heater reaches a vaporization point of the liquid” and “phase transition from liquid to gas”

because Bugnacki uses the air rather than liquid to fill the accelerometer cavity and therefore cannot teach these aspects of amended claim 1.

With regard to the Examiner's reliance on Gaitan, this reference has only been relied on for its teachings of the heater arrangement. This reference also fails to disclose the above combination of the elements as set forth in amended independent claim 1. Accordingly, this reference fails to cure the deficiencies of Dao, Leung, and Bugnacki.

Accordingly, none of those references utilized by the Examiner individually or in combination teach or suggest the limitations of amended independent claim 1 or its dependent claims. Therefore, Applicant respectfully submits that all of the claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

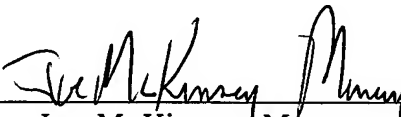
It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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